CLAIMS

What is claimed is:

1. A method of determining characteristics of an injection well, comprising:

obtaining an initial temperature profile along a deviated wellbore prior to injection;

measuring the temperature of an injection fluid prior to injection;

injecting the injection fluid into the deviated wellbore;

establishing a temperature profile; and

determining a flow profile for the injection fluid based on a well model utilizing the initial temperature profile, the temperature of the injection fluid, and the temperature profile.

2. The method as recited in claim 1, wherein obtaining an initial temperature profile comprises obtaining the temperature profile with a distributed temperature sensor.

3. The method as recited in claim 1, wherein injecting the injection fluid comprises injecting water into the deviated wellbore.

4. The method recited in claim 1, wherein establishing a temperature profile comprises establishing a temperature profile over a time period with a distributed temperature sensing system.

5. The method as recited in claim 1, wherein establishing a temperature profile comprises establishing a temperature profile during an injection.

6. The method as recited in claim 1, wherein establishing a temperature profile comprises establishing the temperature profile during a shut-in period.

7. The method as recited in claim 1, wherein determining a flow profile comprises determining the flow profile along a substantial length of a generally horizontal portion of the deviated wellbore.

8. The method as recited in claim 1, wherein determining a flow profile comprises selecting a grid scheme and a grid size along the wellbore.

9. The method as recited in claim 1, wherein determining a flow profile comprises factoring a thermal conductivity of the reservoir into the well model.

10. The method as recited in claim 1, wherein determining a flow profile comprises factoring an injection rate into the well model.

11. The method as recited in claim 1, wherein determining a flow profile comprises factoring historical data into the well model.

12. The method as recited in claim 1, wherein determining a flow profile comprises factoring a permeability of the reservoir into the well model.

13. A method of determining characteristics of a well, comprising:

injecting a liquid into a generally horizontal wellbore of a well;

shutting the well in for a shut-in period; and

determining a flow profile based on temperature profiles taken during the shut-in period.

14. The method as recited in claim 13, wherein shutting the well in comprises shutting the well for one to two days.

15. The method as recited in claim 13, wherein the temperature profiles are obtained via a distributed temperature sensor.

16. The method as recited in claim 13, wherein shutting the well in comprises stopping injection of the liquid until a sufficient temperature contrast develops between the liquid and the wellbore.

17. The method as recited in claim 13, further comprising repeating injecting, shutting in and restarting injection of the well.

18. A method of determining a flow profile in a deviated well, comprising:

injecting a fluid into a deviated wellbore; and

applying a multi-segment well model to measured well parameters for determining an injected flow profile for the liquid.

19. The method as recited in claim 18, wherein injecting a fluid comprises injecting water.

20. The method as recited in claim 18, wherein applying a multi-segment well model comprises applying the multi-segment well model to a temperature profile.

21. The method as recited in claim 18, wherein applying a multi-segment well model comprises applying the multi-segment well model to a temperature profile taken during an injection period.

22. The method as recited in claim 18, wherein applying a multi-segment well model comprises applying the multi-segment well model to a temperature profile taken during a shut-in period.

23. The method as recited in claim 20, wherein applying a multi-segment well model further comprises incorporating a thermal conductivity of the reservoir into the multi-segment well model.

24. The method as recited in claim 20, wherein applying a multi-segment well model further comprises incorporating an injection rate into the multi-segment well model.

25. The method as recited in claim 20, wherein applying a multi-segment well model further comprises incorporating an injection time period into the multi-segment well model.

26. The method as recited in claim 20, wherein applying a multi-segment well model further comprises incorporating a permeability of the reservoir into the multi-segment well model.

27. A system, comprising:

a temperature sensor deployed in a deviated wellbore of an injection well to obtain temperature data along the wellbore; and

a processor system able to receive the temperature data and to utilize the temperature data in deriving a flow profile of a fluid injected along the deviated wellbore.

28. The system as recited in claim 27, wherein the temperature sensor comprises a distributed temperature sensor.

29. The system as recited in claim 27, wherein the processor system utilizes temperature data obtained during injection of the fluid.

30. The system as recited in claim 27, wherein the processor system utilizes temperature data obtained during a shut-in period.

31. The system as recited in claim 28, wherein the processor system utilizes a multi-segment well model.

32. The system as recited in claim 28, wherein the deviated wellbore is generally horizontal.

33. The system as recited in claim 28, wherein the processor system is also able to receive and process reservoir thermal conductivity data in deriving the flow profile.

34. The system as recited in claim 28, wherein the processor system is also able to receive and process reservoir permeability data in deriving the flow profile.